

## **REMARKS**

### **I. Introduction**

Claims 17 to 40 are pending in the present application. In view of the foregoing amendments and following remarks, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration is respectfully requested.

Applicants note with appreciation the acknowledgment of the claim for foreign priority and the indication that all of the certified copies of the priority documents have been received.

Applicants note with appreciation the acceptance of the drawings filed on June 7, 2001.

Applicants note that an initialed copy of the PTO-1449 paper filed with the Information Disclosure Statement on November 20, 2000 and an initialed copy of the PTO-1449 paper filed with the Supplemental Information Disclosure Statement on June 7, 2001 have not been returned. Applicants respectfully request consideration of the Information Disclosure Statement, PTO-1449 paper and cited references and the Supplemental Information Disclosure Statement, PTO-1449 paper and cited references with the next Office communication.

### **II. Rejection of Claims 17, 19, 22, 23, 25, 30 to 32, 34 to 37, 39 and 40 Under 35 U.S.C. § 103(a)**

Claims 17, 19, 22, 23, 25, 30 to 32, 34 to 37, 39 and 40 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 5,360,679 ("Buswell et al.") in view of U.S. Patent No. 5,875,722 ("Gosselin, Jr. et al."). Applicants respectfully submit that the combination of Buswell et al. and Gosselin, Jr. et al. does not render obvious claims 17, 19, 22, 23, 25, 30 to 32, 34 to 37, 39 and 40 for the following reasons.

Firstly, Applicants note a discrepancy between the Office Action Summary, which indicates that claims 17, 19, 22 to 25, 30 to 32, 34 to 37, 39 and 40 are rejected, and page 2 of the Office Action, which indicates that 17, 19, 22, 23, 25, 30 to 32, 34 to 37, 39 and 40 are rejected. Clarification is respectfully requested.

Claim 17 relates to a fuel-cell system. Claim 17 recites that the fuel-cell system includes a reformer unit configured to produce hydrogen from a raw material. Claim 17 further recites that the fuel-cell system includes a fuel-cell unit

disposed downstream of the reformer unit and operable in accordance with the hydrogen produced by the reformer unit. Claim 17 further recites that the fuel-cell system includes an oxidation device configured to convert carbon monoxide into carbon dioxide and disposed between the reformer unit and the fuel-cell unit. Claim 17 further recites that the fuel-cell system includes a water-injection device disposed at the oxidation device and configured to inject water into the oxidation device.

Claim 32 relates to a method for generating electrical energy using a fuel-cell system. Claim 32 recites that the method includes the step of producing hydrogen from a raw material in a reforming process. Claim 32 further recites that a fuel-cell unit of the fuel-cell system is operable in accordance with the produced hydrogen. Claim 32 further recites that the method includes the step of oxidizing carbon monoxide into carbon dioxide, after the reforming process and upstream of the fuel-cell unit. Claim 32 further recites the step of injecting water during the oxidizing step.

Buswell et al. purportedly relate to a hydrocarbon fueled solid polymer fuel-cell electric power generation system. Buswell et al. state that a selective oxidizer precooler 146 cools the reformatre fuel stream 11 to approximately 280 degrees Fahrenheit. See col. 8, line 67 to col. 9, line 1. Nowhere do Buswell et al. disclose, or even suggest, an oxidation device configured to convert carbon monoxide into carbon dioxide and disposed between a reformer unit and a fuel-cell unit, and a water-injection device disposed at the oxidation device and configured to inject water into the oxidation device, as recited in claim 17. The Office Action admits that Buswell et al. fails to disclose, or even suggest, "the disposition of a water injection device at the oxidation device." Office Action at p. 2.

Gosselin, Jr. et al. purportedly relate to a system and method for flue gas purification for thermal power units. Gosselin, Jr. et al. state that ozone is used for oxidation of selected pollutants. See col. 2, line 66 to col. 3, line 3 and col. 4, lines 32 to 42. Before oxidation, the flue gas is stated to be cooled to a temperature range allowing optimal oxidation, said cooling being accomplished by heat exchange with combustion air, feed water or fuel. See col. 3, lines 3 to 4 and lines 10 to 14. In this cooled temperature range, the sulfur compounds, nitrogen compounds and carbon compounds are stated to be readily oxidized by reaction with ozone. See col. 4, lines 16 to 24. Water, inter alia water that is injected into the exhaust stream, is used for hydration in order to form aerosol pollutants that can be removed by

filtering means. See col. 3, lines 4 to 10 and col. 4, lines 27 to 31 and 43 to 60. The reason for injecting water is solely to form aerosols. Nowhere do Gosselin, Jr. et al. disclose, or even suggest, an oxidation device configured to convert carbon monoxide into carbon dioxide and disposed between a reformer unit and a fuel-cell unit, and a water-injection device disposed at the oxidation device and configured to inject water into the oxidation device, as recited in claim 17. Accordingly, Gosselin, Jr. et al. do not cure the deficiencies of Buswell et al.

The Office Action alleges that Gosselin, Jr. et al. describe a system and method for gas purification wherein the use of a water injection device is disposed at an oxidation device. See Office Action at p. 2. Applicants respectfully disagree. Gosselin, Jr. et al. state that ozone is used as the oxidant and that point D represents an injection chamber for the ozone. See col. 4, lines 32 to 34. Gosselin, Jr. et al. further state that water injection nozzles are provided at point E and that removal of the oxidation products is facilitated by the water vapor. See col. 4, lines 43 to 51. Applicants submit given the downstream nature of the water injection nozzles and the fact that the water is stated to be used to remove already oxidized product, Gosselin, Jr. et al. do not disclose, or even suggest, water-injection device disposed at the oxidation device and configured to inject water into the oxidation device, as recited in claim 17, or injecting water during the oxidizing step, as recited in claim 32.

In rejecting a claim under 35 U.S.C. § 103(a), the Examiner bears the initial burden of presenting a prima facie case of obviousness. In re Rijckaert, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish prima facie obviousness, three criteria must be satisfied. First, there must be some suggestion or motivation to modify or combine reference teachings. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Second, there must be a reasonable expectation of success. In re Merck & Co., Inc., 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art reference(s) must teach or suggest all of the claim limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). As more fully set forth above, neither Buswell et al. nor Gosselin, Jr., et al. discloses, or even suggests, a water-injection device disposed at the oxidation device and configured to inject water

into the oxidation device, as recited in claim 17, or a method for generating electrical energy using a fuel-cell system step including the step of injecting water during the oxidizing step, as recited in claim 32. It is therefore respectfully submitted that the combination of Buswell et al. or Gosselin, Jr., et al. does not render obvious claims 17 and 32.

Moreover, it is respectfully submitted that the cases of In re Fine, supra, and In re Jones, 21 U.S.P.Q.2d 1941 (Fed. Cir. 1992), make plain that the Office Action's generalized assertions that it would have been obvious to modify or combine references do not properly support a § 103 rejection. It is respectfully submitted that those cases make plain that the Office Action reflects a subjective "obvious to try" standard, and therefore does not reflect the proper evidence to support an obviousness rejection based on the references relied upon. In particular, the Court in the case of In re Fine stated that:

The PTO has the burden under section 103 to establish a *prima facie* case of obviousness. It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. This it has not done. . . .

**Instead, the Examiner relies on hindsight in reaching his obviousness determination. . . . One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.**

In re Fine, 5 U.S.P.Q.2d at 1598 to 1600 (citations omitted; italics in original; emphasis added). Likewise, the Court in the case of In re Jones stated that:

Before the PTO may combine the disclosures of two or more prior art references in order to establish *prima facie* obviousness, there must be some suggestion for doing so, found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. . . .

**Conspicuously missing from this record is any evidence, other than the PTO's speculation (if it be called evidence) that one of ordinary skill . . . would have been motivated to make the modifications . . . necessary to arrive at the claimed [invention].**

In re Jones, 21 U.S.P.Q.2d at 1943, 1944 (citations omitted; italics in original).

That is exactly the case here since it is believed and respectfully submitted that the present Office Action offers no evidence whatsoever, but only conclusory hindsight, reconstruction and speculation, which these cases have indicated does not constitute evidence that will support a proper obviousness finding. None of the patents relied upon mention or refer to the motivation alleged in the Office Action for making the proposed combination.

Unsupported assertions are not evidence as to why a person having ordinary skill in the art would be motivated to modify or combine references to provide the claimed subject matter of the claims to address the problems met thereby. Accordingly, the Office must provide proper evidence of a motivation, outside of Applicants' application, for modifying or combining the references to provide the claimed subject matter.

The Office Action admits that the oxidation reactions disclosed by Buswell et al. (directed to conversion of carbon monoxide to carbon dioxide) and Gosselin, Jr. et al. (directed to conversion of sulfur dioxide and nitrogen dioxide to sulfuric acid and nitric acid, respectively) are different and distinct chemical reactions but alleges that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Buswell et al. by incorporating the addition of external water through the use of water injection, as allegedly described by Gosselin, Jr. et al. because adding external water through water injection allegedly helps to humidify the reactant stream and facilitate desired chemical reactions to take place. Office Action at p. 3. Applicants respectfully disagree for the reasons set forth below.

Firstly, Applicants submit that one skilled in the art of fuel-cells would not have looked to a purification device, such as the one described by Gosselin, Jr. et al., to overcome any design difficulties in the art of fuel-cells. Gosselin, Jr. et al. are stated to relate to the "field of pollution controls and thermal power plant operation", see col. 1, lines 10 to 11, which is very different than the field of fuel-cell systems. The Office Action admits that Gosselin, Jr., et al. deal with conversion of sulfur dioxide and nitrogen dioxide to sulfuric acid and nitric acid, respectively, not carbon monoxide to carbon dioxide. Further, there is no suggestion or motivation provided by Gosselin, Jr. et al. to use any given component of its system in a fuel-cell system.

Regarding motivation to combine the references, the Office Action makes reference to Gosselin, Jr. et al. and alleges that the “overall function of adding external water to these reactions is to govern and control the thermodynamics of the process”, Office Action at p.2, and that “adding external water through water injection helps to humidify the reactant stream and facilitate desired chemical reactions to take place.” Office Action at p. 3. Thus, it appears that the Office Action is suggesting that these broad statements provide motivation to add water to any oxidization reaction in any device for whatever reason. Such unsupported assertions do not properly support an obviousness determination under 35 U.S.C. § 103(a).

Gosselin, Jr. et al. add water to its oxidization reaction for a different reason than the present invention as claimed. Accordingly, not only does the reaction itself involve different agents, as the Office Action admits, water is added to the reactions for different reasons. Water is stated to be added to induce oxides of sulfur and nitrogen compounds into acid aerosols for subsequent removal by filtration. See col. 4, lines 58 to 60. This is in contrast to the present invention in which water is added to directly remove carbon monoxide from the process gas and to cool the process gas so that it may be directed to the fuel-cell unit without an expensive cooling device or using a correspondingly less expensive cooling device. See Specification at page 4, line 36 to page 5, line 5.

As indicated above, the Office Action admits that Gosselin, Jr., et al. deal with a different type of chemical reaction, namely, conversion of sulfur dioxide and nitrogen dioxide to sulfuric acid and nitric acid, respectively, but alleges that these reactions, including the addition of water, are “fundamentally equivalent”. Office Action at p. 3. As indicated above, however, the water in Gosselin, Jr. et al, is stated to remove already oxidized product. See col. 4, lines 43 to 51. Therefore, given that the general use of the water is different in Gosselin, Jr. et al., i.e., it is not used to oxidize and cool, Applicants submit that Gosselin, Jr. et al. in no way would have suggested to one skilled in the art at the time the invention was made to use water injection in a fuel-cell system, as claimed in claims 17 and 32.

Further, it is respectfully requested pursuant to 37 C.F.R. § 1.104(d)(2) that the Examiner provide an affidavit and/or that the Examiner provide published information concerning these assertions regarding allegations of “fundamental equivalence.” This is because this rejection is apparently being based on assertions

that draw on facts within the personal knowledge of the Examiner, since no support was provided for these otherwise conclusory and unsupported assertions. (See also M.P.E.P. § 2144.03).

Applicants further submit that Buswell et al. and Gosselin, Jr. et. al. in effect teach away from the invention as claimed in claims 17 and 32.

Gosselin, Jr. et al. state that a heat exchanger is used to cool the flue gas to a temperature range just above the acid dew point. In this temperature range, the sulfur compounds, nitrogen compounds and carbon compounds are stated to be readily oxidized by reaction with ozone. See col. 4, lines 16 to 24. This is in direct contrast to the present invention where the necessity of a cooling device is obviated because water injection is used to cool the process gas. Specification at page 4, line 36 to page 5, line 5. Applicants submit that given Gosselin, Jr. et al. use a heat exchanger to cool the flue gas Gosselin, Jr. et al. in effect teach away from the invention as claimed in claims 17 and 32. Further, Buswell et al.'s use of a oxidizer precooler 146 to cool the reformate fuel stream 11 also in effect teaches away from use of a water injection for cooling purposes. See col. 8, line 67 to col. 9, line 1.

The Federal Circuit in the case of In re Kotzab has made plain that even if a claim concerns a “technologically simple concept” -- which is not the case here -- there still must be some finding as to the “specific understanding or principle within the knowledge of a skilled artisan” that would motivate a person having no knowledge of the claimed subject matter to “make the combination in the manner claimed,” stating that:

In this case, the Examiner and the Board fell into the hindsight trap. The idea of a single sensor controlling multiple valves, as opposed to multiple sensors controlling multiple valves, is a technologically simple concept. With this simple concept in mind, the Patent and Trademark Office found prior art statements that in the abstract appeared to suggest the claimed limitation. But, there was no finding as to the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of Kotzab's invention to make the combination in the manner claimed. In light of our holding of the absence of a motivation to combine the teachings in Evans, we conclude that the Board did not make out a proper prima facie case of obviousness in rejecting [the] claims . . . under 35 U.S.C. Section 103(a) over Evans.

In re Kotzab, 55 U.S.P.Q.2d 1313, 1318 (Fed. Cir. 2000) (emphasis added). Again, it is believed that there have been no such findings.

The present rejection also ignores the mandate of 35 U.S.C. § 103(a), which requires a determination of whether the claimed invention as a whole would have been obvious to a person of ordinary skill in the art. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530, 218 U.S.P.Q. 871 (Fed. Cir. 1983). Distilling an invention down to the “gist” or “thrust” of an invention disregards the requirement of analyzing the subject matter as a whole. W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). The “rejection” appears to be based on the misapprehension that the “gist” or “thrust” of the present claims is merely injecting water in any device during oxidation of any gas and ignores the claims as a whole.

Not only must the claims as a whole be considered in determining whether the claims are obvious, but each prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. Id. As more fully set forth above, both Buswell et al. and Gosselin Jr, et al. in effect teach away from the invention as claimed in claims 17 and 32. The present Office Action plainly ignores such teachings away, and, consequently, the present rejection fails to consider each of the cited patents in their entirety.

In view of all of the foregoing, it is respectfully submitted that the combination the Buswell et al. and Gosselin, Jr. et al. does not render obvious claims 17 and 32.

As for claims 19, 22 to 25, 30 and 31, which ultimately depend from claim 17 and therefore include all of the limitations of claim 17, it is respectfully submitted that the combination of Buswell et al. and Gosselin, Jr. et al. does not render obvious these dependent claims for at least the same reasons given above in support of the patentability of claim 17. In re Fine, supra (any dependent claim that depends from a non-obvious independent claim is non-obvious).

As for claims 34 to 37, 39 and 40, which ultimately depend from claim 32 and therefore include all of the limitations of claim 32, it is respectfully submitted that the combination of Buswell et al. and Gosselin, Jr. et al. does not render obvious these dependent claims for at least the same reasons given above in

support of the patentability of claim 32. In re Fine, supra (any dependent claim that depends from a non-obvious independent claim is non-obvious).

Regarding claims 22, 23, and 25, Applicants submit the following additional reason in support of patentability. Nowhere do Buswell et al. and Gosselin, Jr. et al. disclose, or even suggest, a two-stage compressor configured to supply compressed air to at least one of a process gas between the oxidation device and the fuel-cell unit and a cathode of the fuel-cell unit, as recited in claim 22. Nor do Buswell et al. and Gosselin, Jr. et al. disclose, or even suggest, a water separation device disposed in at least one of an exhaust-gas stream from a cathode of the fuel-cell unit, an exhaust-gas stream from an anode of the fuel-cell unit and a cleaned-gas stream from the oxidation unit, the water separating device being configured to separate the water contained in the corresponding gas and to supply the water to a water-storage device disposed upstream from the reformer unit, as recited in claim 23. Nor do either Buswell et al. or Gosselin, Jr. et al. disclose, or even suggest, a water circulation loop configured to cool at least one of the water separation device, the fuel-cell unit, air supplied to a cathode of the fuel-cell unit and air supplied to the reformer unit, as recited in claim 25. Therefore, Applicants request withdrawal of the 35 U.S.C. §103(a) rejection and allowance of claims 22, 23 and 25 for these additional reasons.

In summary, it is respectfully submitted that the combination the Buswell et al. and Gosselin, Jr. et al. does not render obvious claims 17, 19, 22 to 25, 30 to 32, 34 to 37, 39 and 40. Therefore, withdrawal of the 35 U.S.C. §103(a) rejection and allowance of claims 17, 19, 22 to 25, 30 to 32, 34 to 37, 39 and 40 is respectfully requested.

### **III. Allowable Subject Matter**

Applicant notes with appreciation the indication of allowable subject matter contained in claims 18, 20, 21, 26 to 29, 33 and 38. In this regard, the Examiner will note that each of claims 18, 20, 26, 28, 33 and 38 has been rewritten herein in independent form to include all of the limitations of its respective base claim and any intervening claims. The Examiner will further note that claims 21, 27 and 29 depend from amended allowable claims. It is therefore respectfully submitted that claims 18, 20, 21, 26 to 29, 33 and 38 are in condition for immediate allowance.

**IV. Conclusion**

It is therefore respectfully submitted that all of the presently pending claims are allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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